SAMOPJ's Approach to Enterprise GIS

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Mobile District

Mobile GIS in a Nutshell

- GIS In Mobile District
- Infrastructure
  - SAMOPJ Team
  - System Design and Architecture
  - Where to start

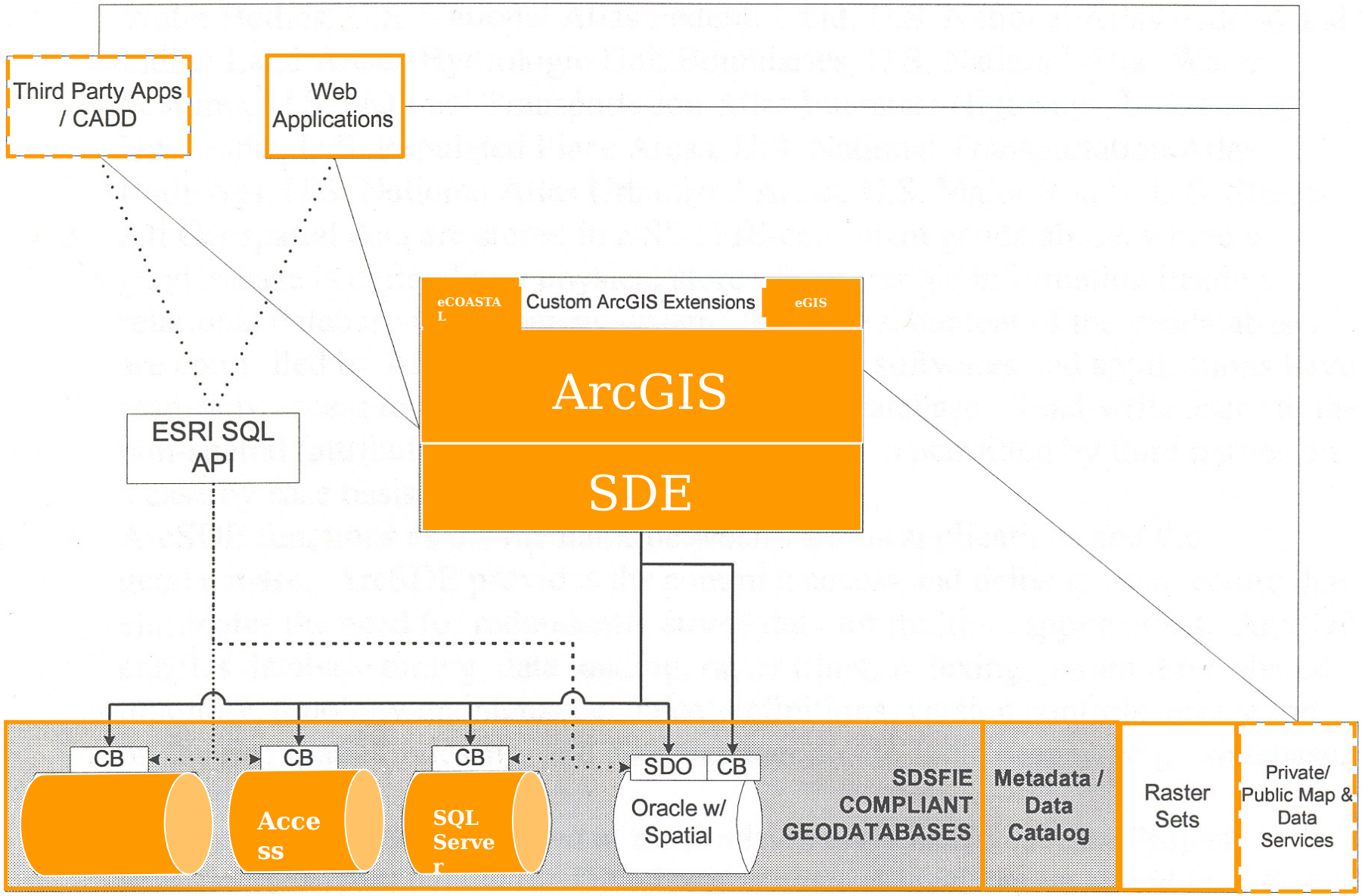
GIS Implementation Goals

- To organize, develop and maintain various types of coastal data and resources into a comprehensive Geographic Information System (GIS).

USACE Enterprise GIS

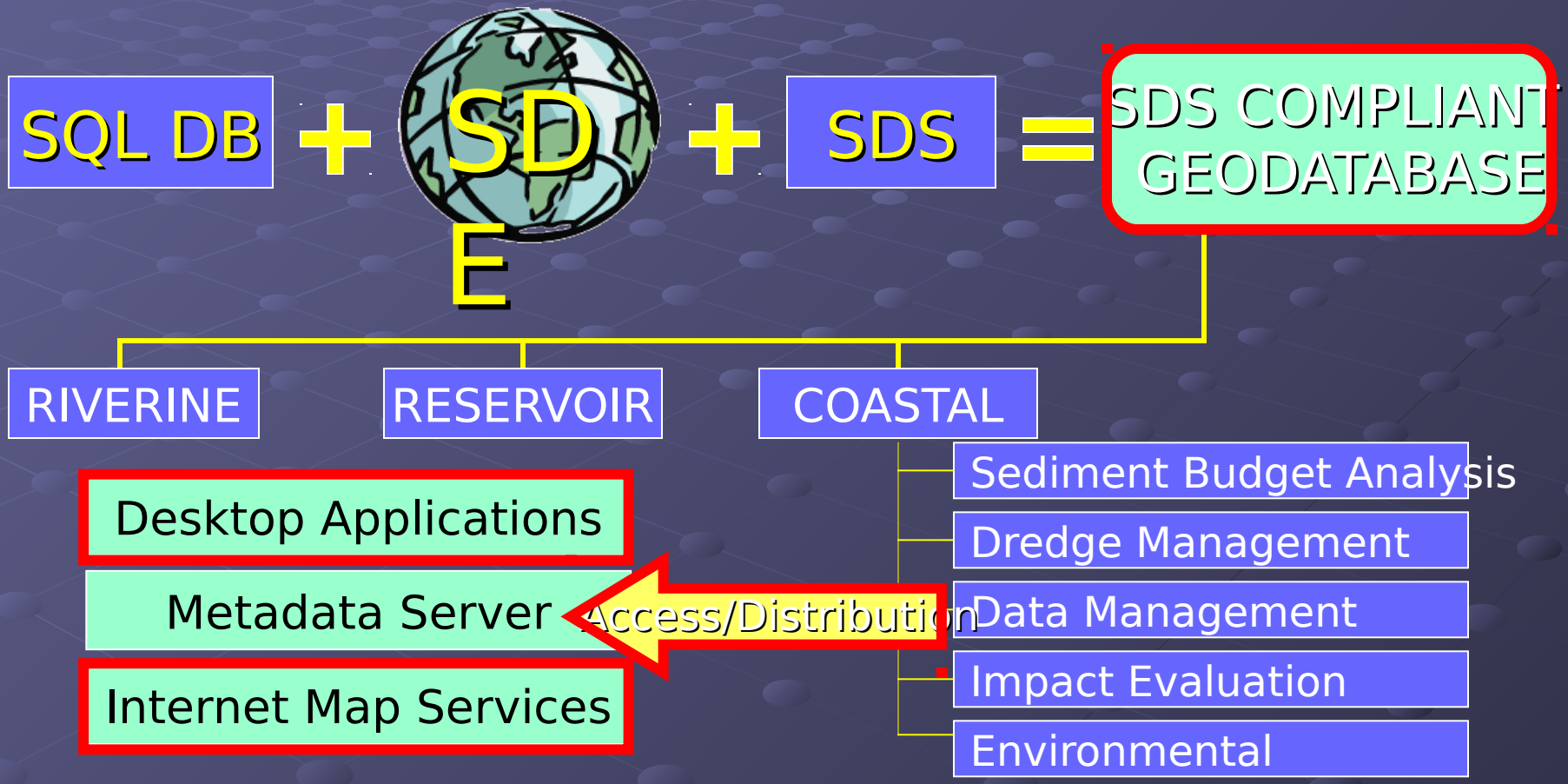
Integrated geospatial technology *infrastructure* delivering spatial information products, services and standard datasets to all *business elements and processes* of the organization

ficial USACE Enterprise GIS Architectu



eCOASTAL is consistent with geospatial technology guidance from OMB and OSD

eGIS : Enterprise Solution & Decisions



eGIS Business Functions

- eCoastal: RSM, SBAS, Silent Inspector
- eReservoir: Shoreline Management, Sign Management
- eRiverine: BWT Bathymetry Update

Each element fuels the Enterprise GIS

What is eCoastal?

- Geodatabase structure that includes coastal related, SDS (Spatial Data Standard) compliant datasets
  - Bathymetric and condition surveys, dredging information, NOAA Charts, etc.
- Also includes a set of custom desktop (ArcGIS) and web (ArcIMS) applications designed for the coastal engineer

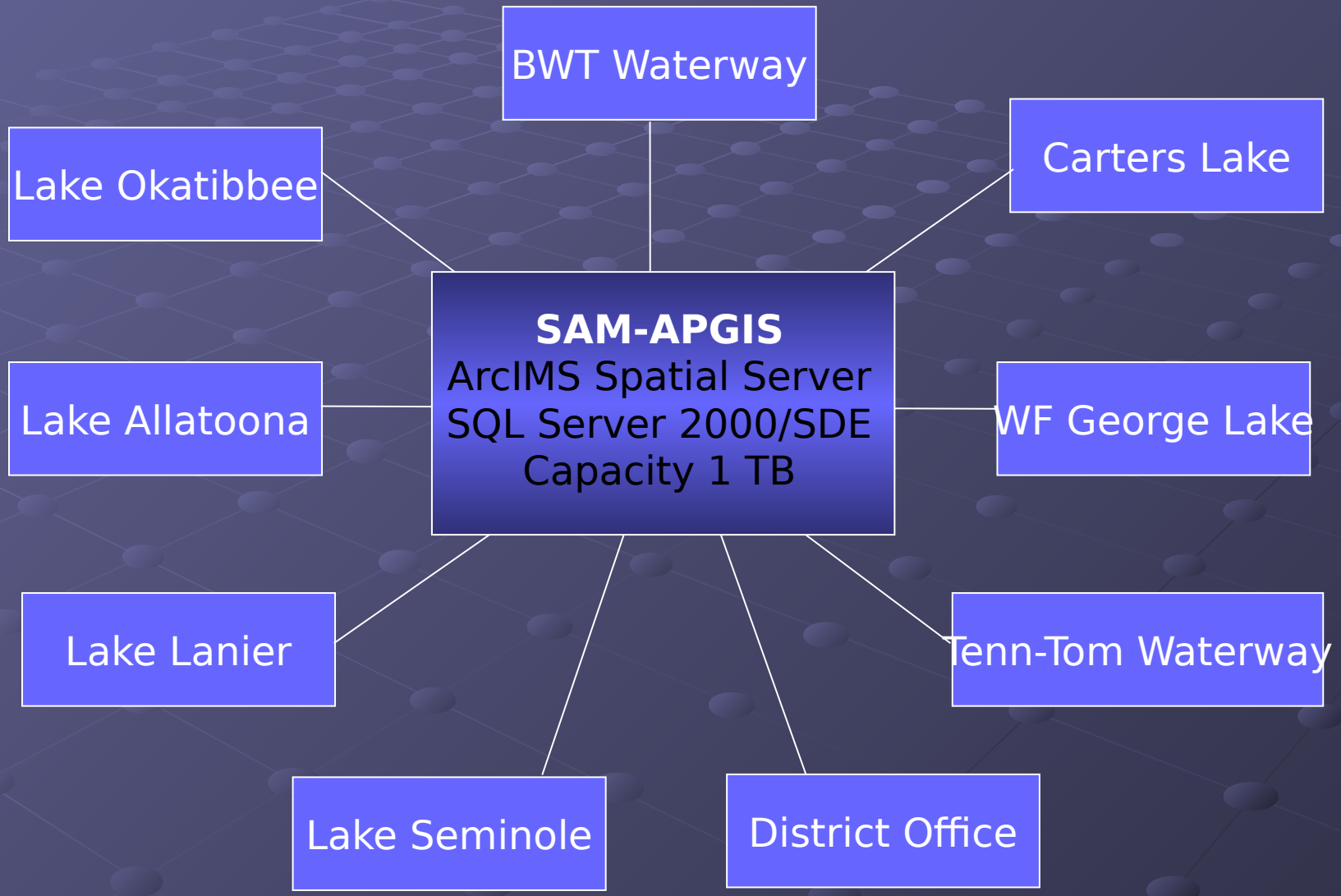
What is eCoastal? (cont.)

- eCoastal was derived from the development efforts of:
  - Regional Sediment Management (MDO)
  - DMSmart (CHL)
  - Silent Inspector (CHL)
- eCoastal acts as an enterprise solution for managing coastal specific datasets and associated applications

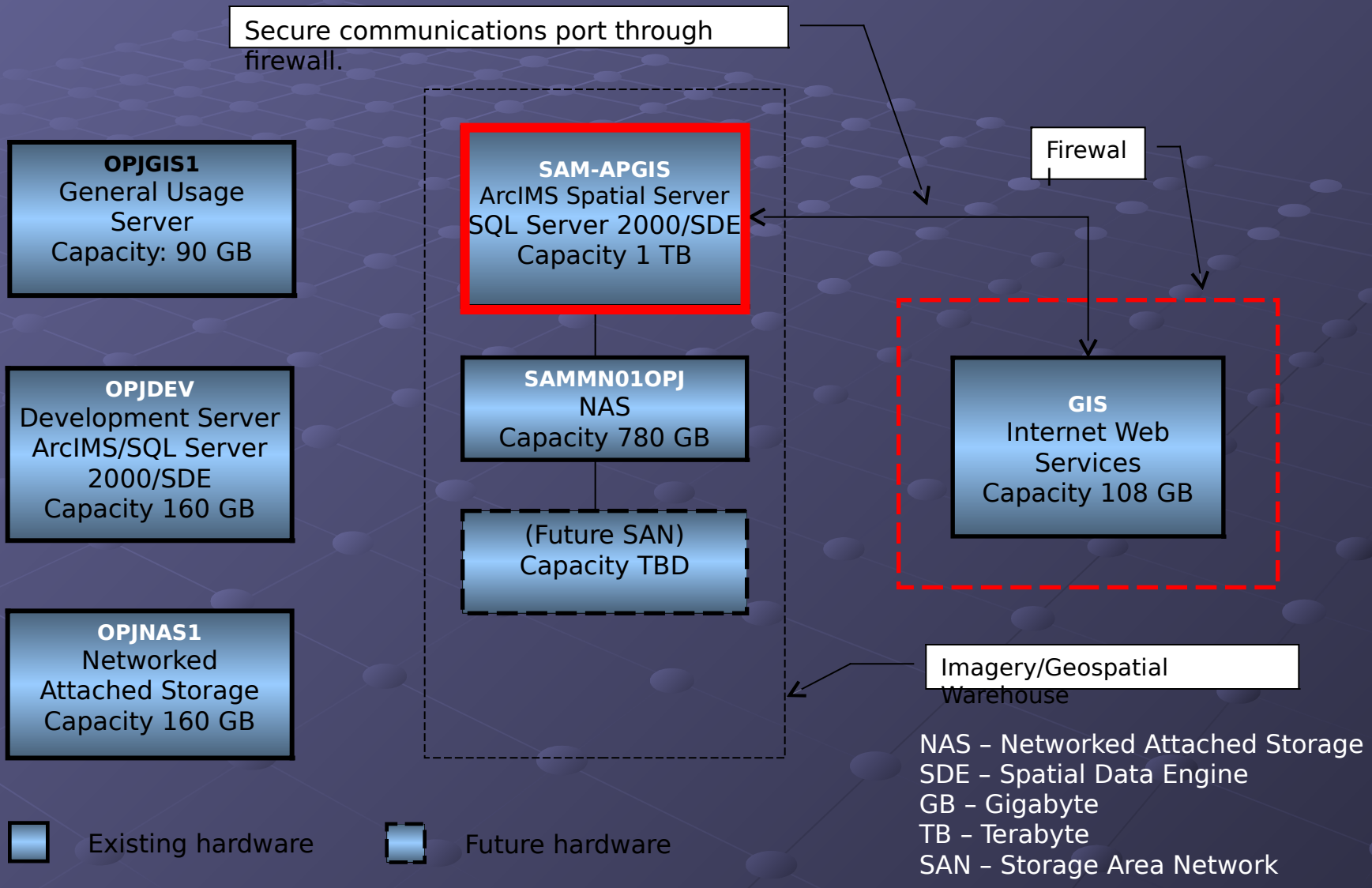
GIS in the Mobile District

- SAMOPJ serves as the primary POC for GIS development in the Mobile District
  - GIS Team: 4 Developers, 5 Analysts, 1 Project Manager
    - #1 job priority is to develop, populate or support GIS related databases and applications.
    - Each member has specialty (imagery, databases, vector editing, etc.)
    - SAMOPJ team members are delegated to various operations in the District
- District GIS User Groups help focus development of future applications

SAMOPJ-GIS Network



SAMOPJ-GIS Network



NAS – Networked Attached Storage
SDE – Spatial Data Engine
GB – Gigabyte
TB – Terabyte
SAN – Storage Area Network

Geodatabase Population

- SDS Compliant Geodatabase
- Over 30 Feature Datasets
- Over 100 Feature Classes
- One geodatabase serves data, via map services, inside and outside the firewall.
- Approx 70 GB

Sample Feature Class

GCWGS84_VECTOR.GCWGS84.channel_xsection_line
GCWGS84_VECTOR.GCWGS84.depth_contour_line
GCWGS84_VECTOR.GCWGS84.elevation_contour_line
GCWGS84_VECTOR.GCWGS84.elevation_profile_point
GCWGS84_VECTOR.GCWGS84.physiographic_area
GCWGS84_VECTOR.GCWGS84.sediment_modeling_point
GCWGS84_VECTOR.GCWGS84.sediment_sample_point
GCWGS84_VECTOR.GCWGS84.shoal_area
GCWGS84_VECTOR.GCWGS84.sounding_point
GCWGS84_VECTOR.GCWGS84.spot_elevation_point
GCWGS84_VECTOR.GCWGS84.survey_trackline

- Approx 50 million points (30 GB) in one feature class

Coastal Coverage

TOCOORD_Z	HYDSRV_ID*	QUASOU_D	PROJECT_ID*	ELEVATION
	0026	<Null>	C006	-11.9399995803833
	0026	<Null>	C006	-12.2399997711182
	0026	<Null>	C006	-11.5799999237061
	0026	<Null>	C006	-4.53000020980835
	0026	<Null>	C006	-11.0200004577637
	0026	<Null>	C006	-11.1499996185303

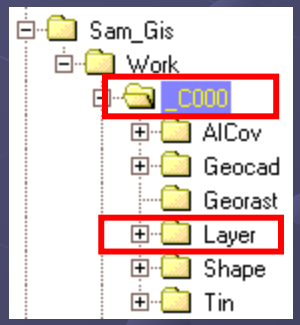
SDS Attributes include 2 ID fields that identify various surveys

System Architecture

Spatial Data Server

- Stores all vector and raster data in SQL Geodatabase
- Stores all layer files that reference the Geodatabase in the following directory structure:

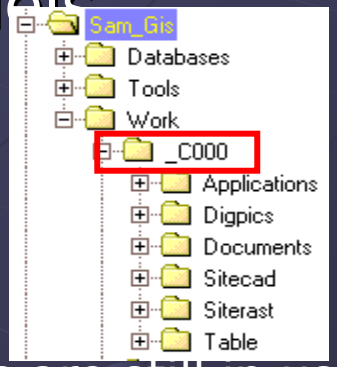
Project Code



Non-Spatial Data Server

- Uses the following directory structure to store Documents, Digital Pictures, and the non-spatial database the fuels the custom application.

Project Code



*directory structures are still in use to support those users who still maintain shapefiles.

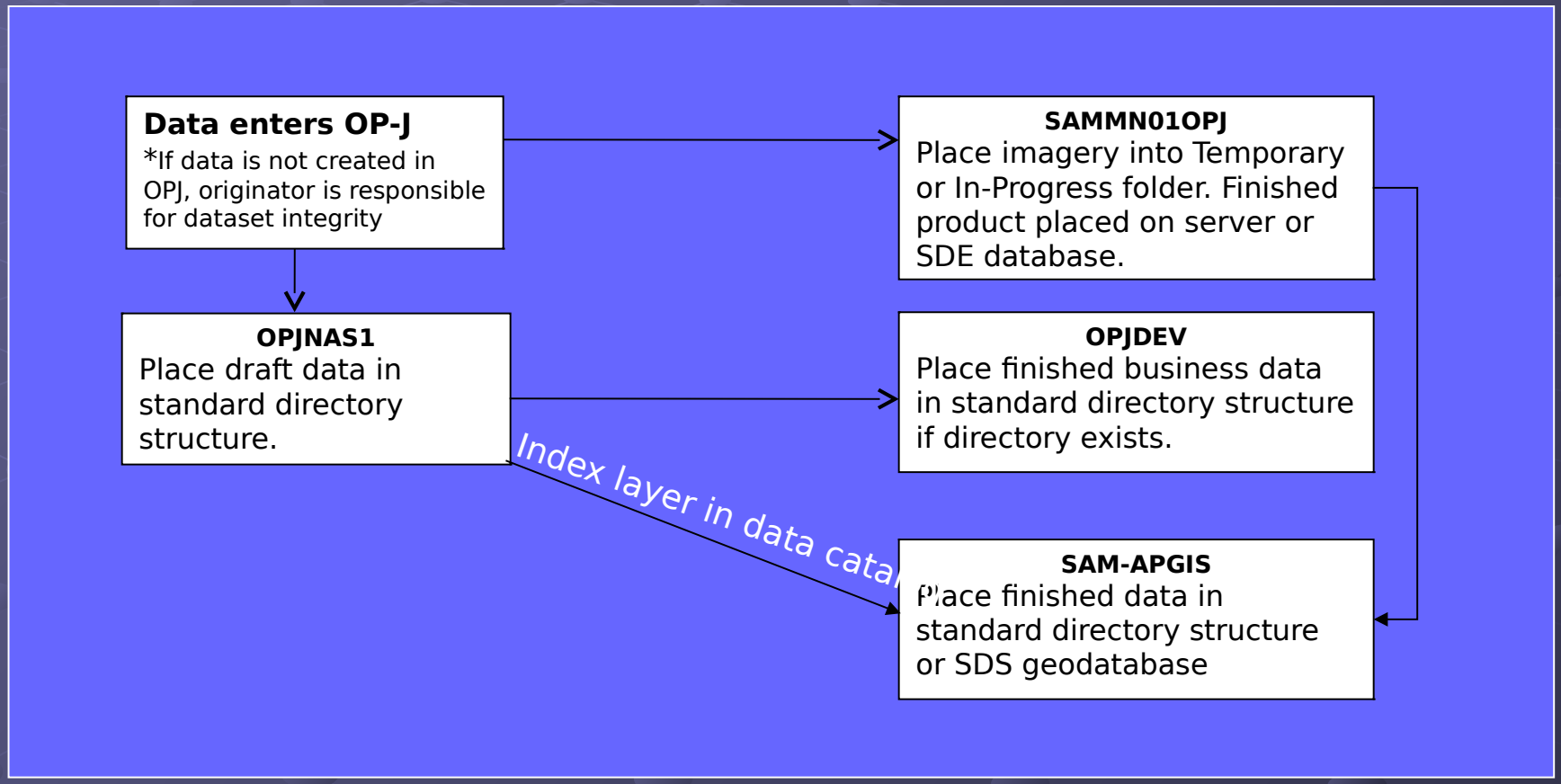
Supplemental Database

- GIS Management Database has been created to handle supplemental data
  - Simple MS Access database
  - .NET Web Application
- Non-spatial data indexing
  - Layer File Index
  - Project Code Index
  - Document Manager Index

Why Layer Files?

- Layer File = *.lyr
- Layer files retain layer symbology, database connection strings, and definition queries
- Compatible with feature classes and shapefiles
  - Can be leveraged to various types of project infrastructure – directory structure vs geodatabase

Business Flow


Data enters OP-J
*If data is not created in OPJ, originator is responsible for dataset integrity
OPJNAS1
Place draft data in standard directory structure.
SAMMN01OPJ
Place imagery into Temporary or In-Progress folder. Finished product placed on server or SDE database.
OPJDEV
Place finished business data in standard directory structure if directory exists.
SAM-APGIS
Place finished data in standard directory structure or SDS geodatabase

Data Access

- Users can access data via an ArcGIS desktop interface with custom data retrieval applications.
- ArcIMS services have been established to view, analyze and download datasets.

eGIS Support

- User guides, video demonstrations and hands-on set-up are provided to set a firm foundation for the system
- Support message board on SAMOPJ website
- GIS POC designated to each office installation

Where to Start

Phase I – Steps to Create a Comprehensive eGIS

- Acquire data
  - Provide detailed scope of work to ensure data is delivered in GIS-ready format
  - Develop Standard Operating Procedures to assist in data management
- Pre-process data
  - Set projections, SDS compliancy, clean topology, etc.

Data Acquisition (cont.)

- Scope of Work
- Web Tutorial
- Sample Datasets:
  - Sample coastal datasets are available through the Spatial Data Branch Website
    - Lidar Data: points, TINs, Grids
    - Basemap Data: roads, counties, points of interest, cities, etc.
    - Raster Data: timeline of Imagery, NOAA Charts, Quad Sheets

Data Acquisition (cont.)

- Collecting tabular information in a relational database format:
  - Boring log filenames and ID
  - Tracking associated documents by layer name
  - Wave gage data

Phase II: Data Formatting

- Detailed instructions for formatting coastal related datasets are available online
- Quality control all datasets
  - Check scale, accuracy and validity of sources
- Create detailed metadata
  - To be distributed across the eGIS, all datasets must be have an associated FGDC compliant metadata file
  - Analyze metadata to ensure datasets are up to project standards

Formatting Data (cont)

- Formatting CAD Navigation Channels
- Formatting Paper Maps to Georeferenced Raster Images (with Coordinates)
- Working with Vector Data
  - Importing Excel Points
  - Creating Event theme
  - Creating a Grid theme
  - Creating a TIN
- Create Layer Files

SDSFIE Relational Data Model

Entity Set	*Entity Class*	*Entity Type*	*Attribute*	*Domain*
Utilities	Water System	**SDTS (FIPS 173) Data Model**		
	Natural Gas			
	Wastewater	Drain Sump		
		Grease Trap		
		Septic Tank	Capacity	
			Age	
			Composition	Concrete
				Fiberglass
				Steel

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eGIS Implementations

- ArcGIS Desktop Demonstration of populated database and applications
  - SAD – ***Jacksonville***, ***Charleston***, ***MDO Resource Offices***
  - NAD – ***Philadelphia***, Wilmington
  - SWD – Fort Worth, Galveston
  - LRD – Detroit